

Rocky Flats Site

**Quarterly Report of
Site Surveillance and
Maintenance Activities
First Quarter Calendar Year 2009**

July 2009



U.S. DEPARTMENT OF
ENERGY

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**U.S. Department of Energy
Office of Legacy Management**

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Quarterly Report of Site Surveillance and Maintenance Activities

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Abbreviations

Am	americium-241
CAD/ROD	Corrective Action Decision/Record of Decision
CDPHE	Colorado Department of Public Health and Environment
COU	Central Operable Unit
CY	calendar year
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ETPTS	East Trenches Plume Treatment System
GWIS	Groundwater Intercept System
IC	institutional control
LM	Office of Legacy Management
µg/L	micrograms per liter
mg/L	milligrams per liter
M&M	monitoring and maintenance
MCL	maximum contaminant level
MSPTS	Mound Site Plume Treatment System
OLF	Original Landfill
pCi/L	picocuries per liter
PLF	Present Landfill
PLFTS	Present Landfill Treatment System
POC	Point of Compliance
POE	Point of Evaluation
Pu	plutonium-239,240
RCRA	Resource Conservation and Recovery Act
RFLMA	<i>Rocky Flats Legacy Management Agreement</i>
RFSOG	<i>Rocky Flats Site Operations Guide</i>
Site	Rocky Flats Site
SPPTS	Solar Ponds Plume Treatment System
TVS	table value standard
U	uranium
WQCC	Water Quality Control Commission
WQCD	Water Quality Control Division

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1.0 Introduction

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is responsible for implementing the final response action selected in the Final Corrective Action Decision/Record of Decision (CAD/ROD) (DOE 2006a) issued September 29, 2006, for the Rocky Flats Site (the Site). DOE, the U.S. Environmental Protection Agency (EPA), and the Colorado Department of Public Health and Environment (CDPHE) have chosen to implement the monitoring and maintenance requirements of the CAD/ROD as described in the *Rocky Flats Legacy Management Agreement* (RFLMA) (DOE 2007a). Attachment 2 to RFLMA defines the Central Operable Unit (COU) remedy surveillance and maintenance requirements, the frequency for each required activity, and the monitoring and maintenance locations. The requirements include environmental monitoring; maintenance of the erosion controls, access controls (signs), landfill covers, and groundwater treatment systems, as well as operation of the groundwater treatment systems. RFLMA also requires that the institutional controls (ICs), in the form of use restrictions as established in the CAD/ROD, are maintained.

This report is required in accordance with Section 7.0 of Attachment 2 to the RFLMA. The purpose of this report is to inform the regulatory agencies and stakeholders of the remedy-related surveillance, monitoring, and maintenance activities being conducted at the Site. LM provides periodic communications through several means (e.g., this report, Web-based tools, and public meetings).

LM prepared the *Rocky Flats Site Operations Guide* (RFSOG) (DOE 2008a) to serve as the primary internal document to guide work to satisfy the requirements of the RFLMA and implement best management practices at the Site.

Several other Site-specific documents provide additional detail regarding the requirements described in Attachment 2 to RFLMA, including all aspects of surveillance, monitoring, and maintenance activities, as well as data evaluation protocols.

Landfill inspection and monitoring tasks follow the format and protocols established in the *Present Landfill Monitoring and Maintenance Plan and Post-Closure Plan* (M&M Plan) (DOE 2008b) and the *Final Landfill Monitoring and Maintenance Plan, Rocky Flats Environmental Technology Site, Original Landfill* (M&M Plan) (DOE 2006b). These plans include detailed information on monitoring groundwater, surface water, subsidence and consolidation, slope stability, soil cover, vegetation, storm water management structures, and erosion in surrounding features so that maintenance actions can be implemented in a timely manner.

Monitoring data and summaries of surveillance and maintenance activities for past quarters can be found in the quarterly reports. Extensive discussion and evaluation of surveillance, monitoring, and maintenance activities are presented each calendar year in the annual report of Site surveillance and maintenance activities.

This report addresses remedy-related surveillance, monitoring, and maintenance activities conducted at the Site during the first quarter of calendar year (CY) 2009 (January 1 through March 31) and includes:

- Annual Site inspection;
- Maintenance and inspection of the Original Landfill (OLF) and Present Landfill (PLF);
- Maintenance and inspection of the four groundwater treatment systems;
- Erosion control and revegetation activities; and
- Routine (in accordance with RFLMA and the RFSOG) water monitoring.

2.0 Site Operations and Maintenance

2.1 Annual Site Inspection

Annual inspection and monitoring of evidence of significant erosion and violation of ICs is required in accordance with RFLMA Attachment 2, Sections 5.3.4 and 5.3.6. The inspection was conducted on March 25, 2009.

The following categories were inspected or monitored during the inspection:

- Evidence of significant erosion in the COU and evaluation of the proximity of this erosion to subsurface features identified in RFLMA Attachment 2, Figures 3 and 4. This monitoring included visual observation for precursor evidence of significant erosion, such as cracks, rills, slumping, subsidence, and sediment deposition;
- The effectiveness of ICs as determined through any evidence of the violation of any of these controls; and
- Evidence of adverse biological conditions, such as unexpected morbidity or mortality, observed during the inspection and monitoring activities.

As part of the IC inspection, verification that the Environmental Covenant remains in the administrative record and on file in Jefferson County records is also required annually. In addition, physical controls (i.e., signs placed along the COU fence) were also inspected.

The annual inspection was scheduled to allow adequate observation of surface features after snow cover had melted and the surface was dry enough to avoid muddy conditions and before vegetation growth might obscure land surface features.

To conduct this work, knowledgeable DOE, CDPHE, and S.M. Stoller team staff members (the inspection team) walked down the COU surface to observe the conditions. The areas walked down were designated as Areas A through E and are shown on the maps included in Appendix A. These areas generally coincide with the location of the subsurface features in RFLMA Attachment 2, Figures 3 and 4, or they afforded adequate viewing of the surface in these locations (e.g., sloping areas). Several team members were assigned to walk down a particular area or areas identified on the maps. Reference points, such as well heads and roads, were used to orient the team members within designated inspection areas.

The completed inspection checklists and several photographs illustrating noted conditions are also included in Appendix A of this report.

Marker flags were placed at locations where conditions showed evidence of the three condition categories listed above to track their location for follow-up by Site subject matter experts. Areas that required evaluation were documented in the Site Observation Log for evaluation and follow-up. Several areas were noted with evidence of erosion, possible depressions, or holes; however, these appeared to be minor and very limited in area. Most observations were related to metal debris on the surface or trash that was either picked up or marked for subsequent removal and pickup. Rocky Flats field operations subject matter experts will subsequently visit the areas to determine if any observations appear to be significant or require repairs and to collect debris to close out all items in the Site Observation Log. Completion of this work will be reported in the quarterly report for the second quarter 2009.

No evidence of violations of institutional or physical controls was observed.

On March 31, 2009, a team member verified that the Environmental Covenant for the COU remains in the administrative record and on file with the Jefferson County land records, which are used by the Planning and Zoning Department.

No adverse biological conditions were noted during the inspection.

2.2 WQCC Proceedings Related to Rocky Flats

The status of ongoing Water Quality Control Commission (WQCC) proceedings has been routinely updated in quarterly and annual reports. There were two WQCC proceedings during this calendar quarter. The first was related to the uranium (U), gross alpha, and gross beta surface water standards, and the second is related to the triennial review of Site-specific standards for the South Platte River Basin. Big Dry Creek segments 4a, 4b, and 5 on Rocky Flats property are part of this basin.

2.2.1 Uranium and Gross Alpha–Gross Beta Standards

A WQCC rulemaking hearing was held January 12, 2009, to consider revising “Classifications and Numeric Standards for South Platte River Basin, Laramie River Basin, Republican River Basin, Smoky Hill River Basin,” Regulation 38 (Title 5 *Code of Colorado Regulations* 1002-38) (Regulation 38). This revision would eliminate the Site-specific standards in Big Dry Creek segments 4a, 4b, and 5 for U, gross alpha, and gross beta in Regulation 38, Table 2, due to changed hydrological conditions after cleanup and closure of Rocky Flats. The Site-specific, ambient-based radionuclide standards for these analytes were first adopted in 1989 based on ambient conditions during operations. DOE petitioned the WQCC to remove the Site-specific U standard, which would result in the statewide basic standard for U becoming the RFLMA standard. The statewide basic standard for U is the EPA maximum contaminant level (MCL) of 30 micrograms per liter (µg/L). The MCL is approximately twice the RFLMA standard. There is no promulgated statewide basic standard for gross alpha and gross beta. The basis for DOE’s petition is the changed conditions resulting from cleanup and closure.

U in groundwater at Rocky Flats is predominantly natural, as determined prior to closure, through hundreds of samples analyzed at Los Alamos National Laboratory using high-resolution analytical methods. Post-closure high-resolution analysis of targeted groundwater and surface water locations also show that the U is predominantly natural. U that has been confirmed to be 100 percent natural has been measured in Rocky Flats groundwater at concentrations of more than 30 times the current Site-specific standard. With the quantity of runoff reduced through the removal of impervious surfaces and the elimination of imported water, the relative contribution of groundwater to surface water flows at Rocky Flats has increased greatly, and, consequently, U concentrations are also increasing. The groundwater U contribution to surface water base flow indicates that the post-closure ambient U concentration may approach or exceed the 1989 ambient-based standards developed when the plant was operating.

Gross alpha and gross beta standards are used for screening to limit radionuclide concentrations when specific radionuclides contributing to alpha and beta radioactivity are uncertain. The characterization of soil and water during cleanup and closure identified the radionuclide contaminants of concern as U-233/234, U-235, U-238, americium (Am)-241, and plutonium (Pu)-239/240. Specific standards for these isotopes are established in RFLMA Attachment 2, Table 1, making gross alpha and gross beta standards redundant and unnecessary.

The WQCC revised the U standard to 16.8 µg/L rather than the requested revision to 30 µg/L and eliminated the gross alpha and gross beta Site-specific standards. The WQCC statement of basis, Regulation 38, sec. 38.71, is as follows:

BASIS AND PURPOSE The Commission considered revisions to ...[Regulation 38 Table 2] ... standards for uranium, gross alpha and gross beta for segments 4a, 4b, and 5 of Big Dry Creek. The previous uranium standards (10 pCi/L for Walnut Creek and 11 pCi/L for Woman Creek) were set in 1996 based on the then current ambient conditions. Recently, post-closure surface water runoff has decreased and the relative contribution of uranium from groundwater has increased. However, the effects of this hydrologic change have not been quantified. In addition, increased treatment of the Solar Pond Plume area will result in a decrease in uranium from that source. Since there is continued uncertainty about the eventual equilibrium surface water uranium concentrations, the Commission decided that human health-based criteria were more appropriate than table value standards, new ambient-based standards or maintaining the current standards. The question of determining the “lowest practical level” will be left to the future when DOE completes a feasibility study of enhanced treatment of the Solar Pond Plume. The Commission adopted a total uranium standard of 16.8 µg/L to protect human health since the goal for the Rocky Flats site has been to protect all uses. This concentration-based criterion was derived using a reference dose of 0.0006 mg/kg/day and a relative source contribution of 0.8 (see Policy 96-2, Equation 1-1). Based upon a conversion factor of 0.67 pCi/µg uranium, 16.8 µg/L equates to 11.3 pCi/L.

2.2.2 Triennial Review

The rulemaking hearing is scheduled for June 8, 2009. Pursuant to the WQCC’s November 17, 2008, directive resulting from the November 10, 2008, Issues Formulation Hearing and based on informal consultation with Water Quality Control Division (WQCD) staff, DOE provided timely notification to the WQCC administrator before January 15, 2009, that

Rocky Flats would not be proposing any specific revisions to Regulation 38. Thus, any Rocky Flats proposed changes to standards or classifications would be in response to the WQCD Proponent's Pre-Hearing Statement.

Based on the WQCD's March 24, 2009, Proponent's Pre-Hearing Statement, two issues could potentially have an impact on Rocky Flats. The first was related to the proposed lowering of the Site-specific arsenic standard from 50 µg/L to the recently adopted statewide standard of 0.02–10 µg/L. The second was related to the proposed change of the segment 4b and 5 recreational classification from class N (no recreation use) to class E (existing recreation use).

The DOE Responsive Pre-Hearing Statement was filed in accordance with the April 28, 2009, due date. Further discussion of the issues, filings, and outcome of this proceeding will be included in the next quarterly report.

2.3 Landfills

2.3.1 Present Landfill

The PLF is inspected quarterly in accordance with the requirements of the PLF M&M Plan (DOE 2008b) and RFLMA.

2.3.1.1 Inspection Results

The routine PLF inspection for first quarter CY 2009 was performed on February 26, 2009. An evaluation of the landfill cover vegetation was performed on March 9. No significant problems were observed during these inspections. Refer to Appendix B, which provides the landfill inspection forms, for more information. A special inspection of the PLF following a precipitation event that exceeded 3 inches was completed on March 30, 2009, as required by RFLMA. No problems were observed during this inspection.

2.3.1.2 Settlement Monuments

Annual settlement monument surveys were performed on January 9, 2009. Refer to Appendix B for the survey data. Additional information on the settlement monuments is included in the *Quarterly Report of Site Surveillance and Maintenance Activities, First Quarter Calendar Year 2008* (DOE 2008c).

2.3.2 Original Landfill

Formal inspections of the OLF are conducted monthly, consistent with the requirements contained in the OLF M&M Plan (DOE 2006b) and RFLMA. It was anticipated that after the first year, the inspection frequency might be reduced to quarterly for an additional 4 years. However, because of observed localized slumping and seep areas, and repairs to the OLF cover that were being planned, no change to the monthly inspection frequency was recommended in the second 5-year review of the Site (DOE 2007b).

2.3.2.1 Inspection Results

Routine OLF inspections during first quarter CY 2009 were performed on January 29, February 26, and March 30, 2009. An evaluation of the landfill cover vegetation was performed on March 9. Refer to the completed inspection forms in Appendix B for additional information. A special inspection of the OLF following a precipitation event that exceeded 3 inches was completed on March 30, 2009, as required by RFLMA. No problems were observed during this inspection.

2.3.2.2 Seeps

Seeps at the OLF were evaluated during the monthly inspections and during unscheduled visits. Seep 7 showed no surface flow during all three monthly inspections. Installation of the drain extension for Seep 7 was designed to drain this water in the subsurface of the cover to the buttress drain. Seep 4 showed areas of saturation during the February and March inspections but had no surface flow. Seep 8 showed areas of active groundwater seepage at a rate of approximately 0.5 to 1 gallon per minute throughout the first quarter.

Other smaller seeps showed areas of wetness only temporarily after precipitation events. None produced any surface flow.

2.3.2.3 Slumps

No new slumps were observed at the OLF during the first quarter. Areas where the cover is pushed up or rolling are noticeable on the western end of the landfill between Berms 2 and 3; however, the areas do not have any surface cracks at this time.

2.3.2.4 Settlement Monuments

The OLF settlement monuments were surveyed on March 24, 2009. Preliminary survey data indicate that settling at each monument does not exceed the limits published in the OLF M&M Plan. Refer to the survey results in Appendix B for additional information.

2.3.2.5 Inclinerometers

The geotechnical investigation resulted in a recommendation to install seven inclinometers across the landfill cover to monitor displacement over the length of the inclinometer from bedrock to the surface of the cover. Inclinometer measurements were taken during first quarter CY 2009 on February 3 and February 25. No significant displacement was observed.

2.4 Groundwater Treatment Systems

Four groundwater treatment systems are operated and maintained in accordance with requirements defined in RFLMA and the RFSOG. Three of these systems (the Mound Site Plume Treatment System [MSPTS], East Trenches Plume Treatment System [ETPTS], and Solar Ponds Plume Treatment System [SPPTS]) include a groundwater intercept trench (collection trench), which is similar to a French drain with an impermeable membrane on the downgradient side. Groundwater entering the trench is routed through a drain pipe into one or more treatment cells, where it is treated and then discharged. The fourth system, the PLF Treatment System

(PLFTS), treats water from the northern and southern components of the Groundwater Intercept System (GWIS) and flow from the PLF seep.

2.4.1 Mound Site Plume Treatment System

Routine maintenance activities continued at the MSPTS through first quarter CY 2009. These activities included raking the media each week, checking and flushing filters, and inspecting influent and effluent flow conditions. Additionally, to accommodate rising water levels, Cell 1 was switched to upflow configuration; Cell 2 remains configured for downflow.

2.4.2 East Trenches Plume Treatment System

Routine maintenance activities continued at the ETPTS through first quarter CY 2009. These activities included raking the media each week, checking and flushing filters, and inspecting influent and effluent flow conditions.

2.4.3 Solar Ponds Plume Treatment System

Routine maintenance activities continued at the SPPTS through first quarter CY 2009. These activities included weekly inspections of the solar/battery system that powers the pump, operation of the pump, and influent and effluent flow conditions. Inspections of the newly completed (as of late October 2008) Phase I upgrades were performed as well and consisted mainly of inspecting the pump and its solar/battery system. Also, preparations were underway in first quarter CY 2009 for the construction of additional system upgrades (Phases II and III) that were scheduled to be installed in second quarter CY 2009. These upgrades were described in the 2008 annual report (DOE 2009), which focused primarily on the Phase I portion. The Phase II and III portions will be described in detail in the 2009 annual report.

2.4.4 PLF Treatment System

Routine maintenance activities continued at the PLFTS through first quarter CY 2009. These activities generally consisted of inspecting the system for any issues or potential problems.

2.5 Erosion Control and Revegetation

Maintenance of the Site erosion control features required continued effort throughout first quarter CY 2009, especially following high-wind or precipitation events. Repairs were made to erosion wattles and matting loosened and displaced by high winds or rain. Erosion controls were installed and maintained for the various projects that were ongoing during the first quarter. Several areas were interseeded with additional native species to increase vegetation cover.

3.0 Environmental Monitoring

This section provides a summary of the environmental monitoring that was conducted in accordance with RFLMA.

3.1 Water Monitoring

This quarterly report presents data collected during first quarter CY 2009. This section includes:

- A discussion of analytical results for the Point of Compliance (POC), Point of Evaluation (POE), PLF, and OLF monitoring objectives; and
- A summary of groundwater monitoring based on Resource Conservation and Recovery Act (RCRA) requirements at the PLF and OLF.

Monitoring locations, sampling criteria, and evaluation protocols for all water monitoring objectives in the following sections are detailed in Attachment 2 of RFLMA and the RFSOG. Analytical water-quality data for first quarter CY 2009 are provided in Appendix C.

3.1.1 Water Monitoring Highlights

During first quarter CY 2009, the water monitoring network successfully met the targeted monitoring objectives as required by RFLMA and in conformance with the RFSOG implementation guidance. The network consisted of 11 automated gaging stations, 10 surface water grab-sampling locations, 8 treatment system locations, 100 wells, and 8 precipitation gages. During the quarter, 22 flow-paced composite samples, 4 surface water grab samples, 7 treatment system samples, and 12 groundwater samples were collected.¹

All water-quality data at the RFLMA POCs remained well below the applicable standards through first quarter CY 2009.

Reportable 12-month rolling average total U concentrations continued to be observed in surface water at RFLMA POE monitoring station GS10, which is located in South Walnut Creek upstream of Pond B-1 in the Walnut Creek Basin.

The Site continues to evaluate, in coordination with CDPHE and under RFLMA, the measured U concentrations at GS10. Recent GS10 data continue to support the conclusion that the reportable U activities are likely a result of changing hydrologic conditions (particularly the increasing groundwater component with naturally occurring U in surface water flows at GS10, relative to conditions that prevailed prior to Site closure), and that no specific remedial action is indicated at this time. The data do not suggest a previously unknown localized source of contamination that warrants targeted action.

All other POE analyte concentrations remained below reporting levels as of the end of first quarter CY 2009. Erosion and runoff controls, as well as extensive revegetation efforts, have proven to be effective in measurably reducing both sediment transport and constituent concentrations. As of the end of first quarter CY 2009, all of the POEs continued to show

¹ Composite samples consist of multiple aliquots (“grabs”) of identical volume. Each grab is delivered by the automatic sampler to the composite container at each predetermined flow volume or time interval. During first quarter CY 2009, the 22 flow-paced composites comprised 643 individual grabs.

Pu-239,240 and Am-241 activities well below the RFLMA standards. With the removal of impervious areas resulting in decreased runoff, the stabilization of soils within the drainages, and the progression of revegetation, acceptable water quality is expected to continue.

Groundwater monitoring results will be evaluated as part of the 2009 annual report.

3.1.2 POC Monitoring

The following sections include summary tables and plots showing the applicable 30-day and 12-month rolling averages for the POC analytes.

3.1.2.1 Location GS01

Monitoring location GS01 is located on Woman Creek at Indiana Street. Figure 3–1 and Figure 3–2 show no occurrences of reportable 30-day averages for the quarter.

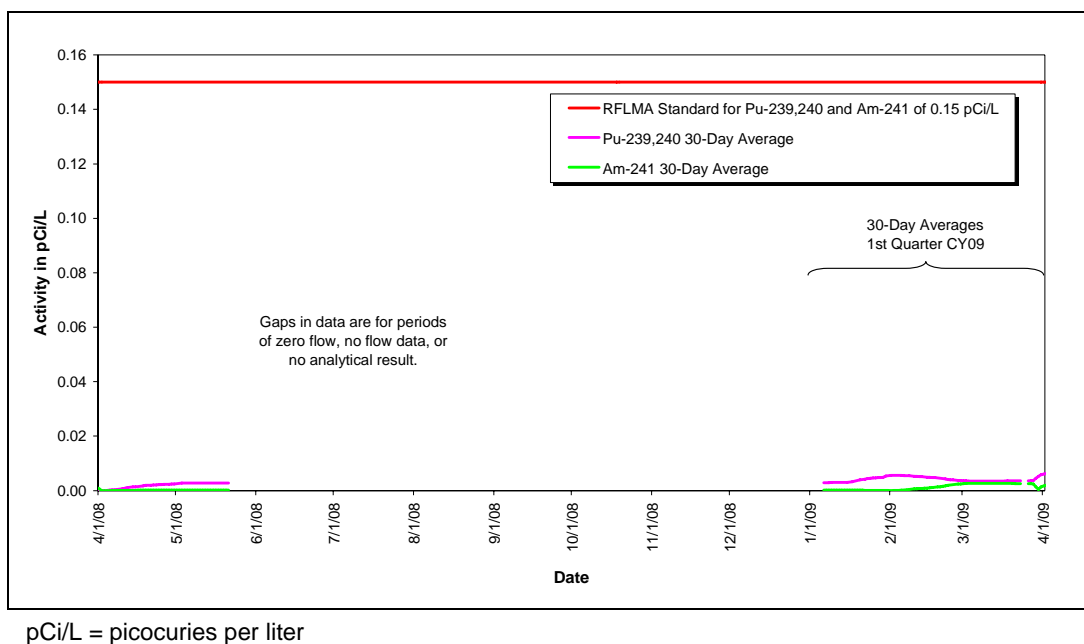


Figure 3–1. Volume-Weighted 30-Day Average Pu and Am Activities at GS01: Calendar Year Ending First Quarter CY 2009

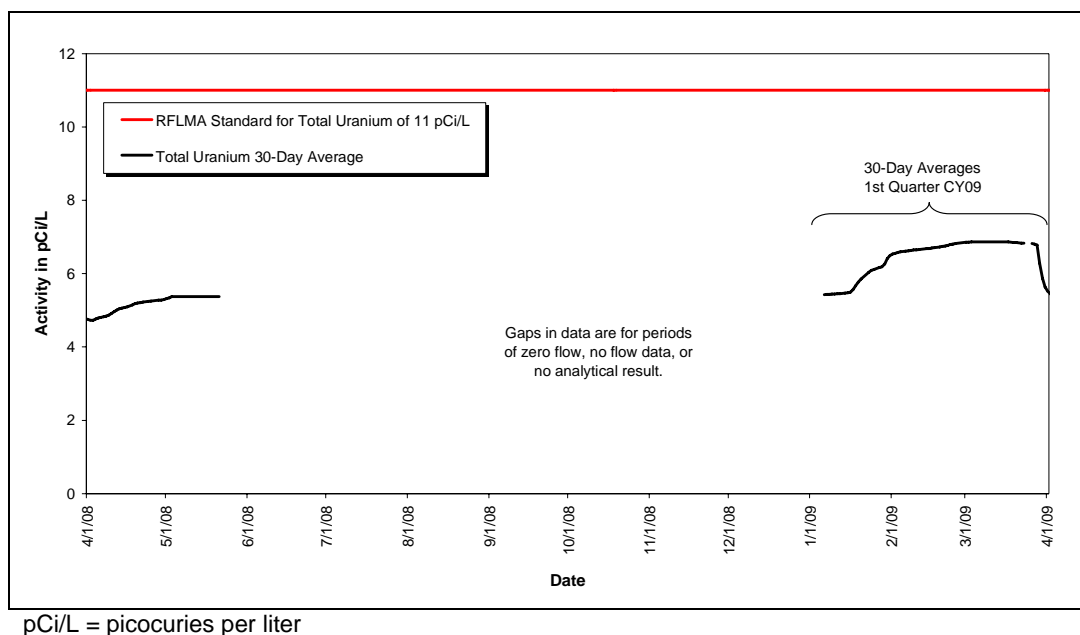


Figure 3–2. Volume-Weighted 30-Day Average Total U Activities at GS01: Calendar Year Ending First Quarter CY 2009

3.1.2.2 Location GS03

Monitoring location GS03 is located on Walnut Creek at Indiana Street. There was no flow at GS03 for the entire period April 1, 2008, through April 1, 2009. Therefore, no compliance values are calculated and no plots are presented.

3.1.2.3 Location GS08

Monitoring location GS08 is located on South Walnut Creek at the outlet of Pond B-5. Figure 3–3, Figure 3–4, and Figure 3–5 show no occurrences of reportable 12-month rolling averages for the quarter.

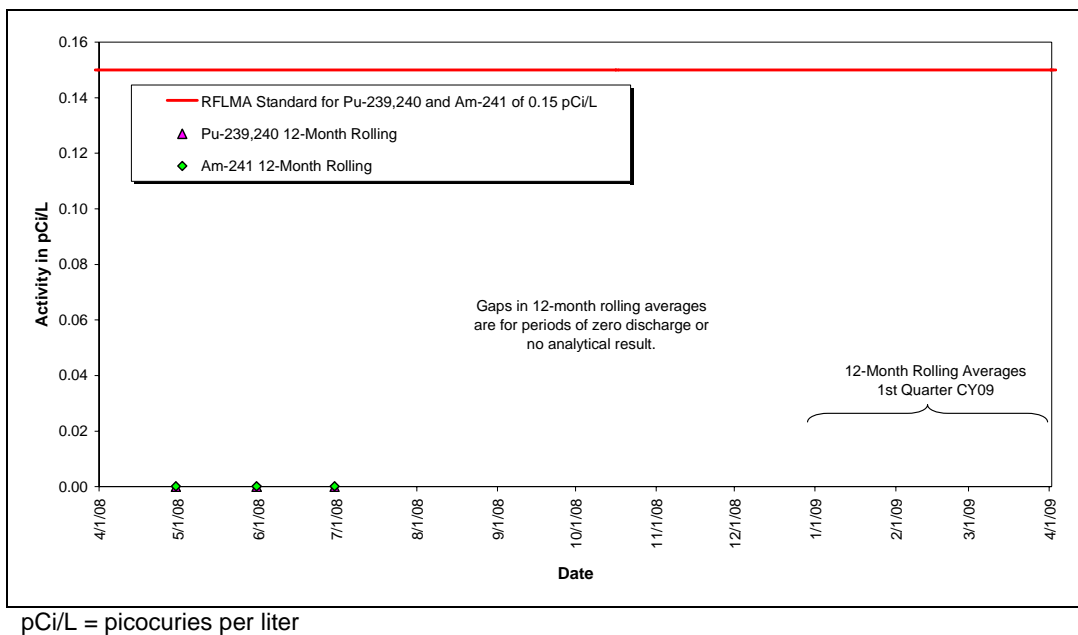


Figure 3–3. Volume-Weighted 12-Month Rolling Average Pu and Am Activities at GS08: Calendar Year Ending First Quarter CY 2009

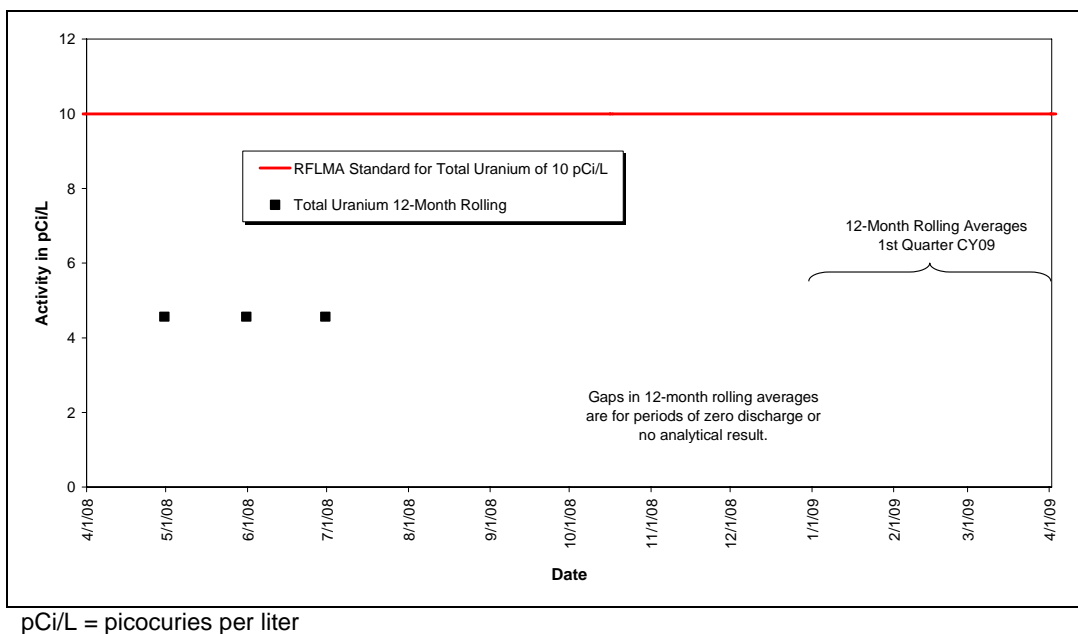
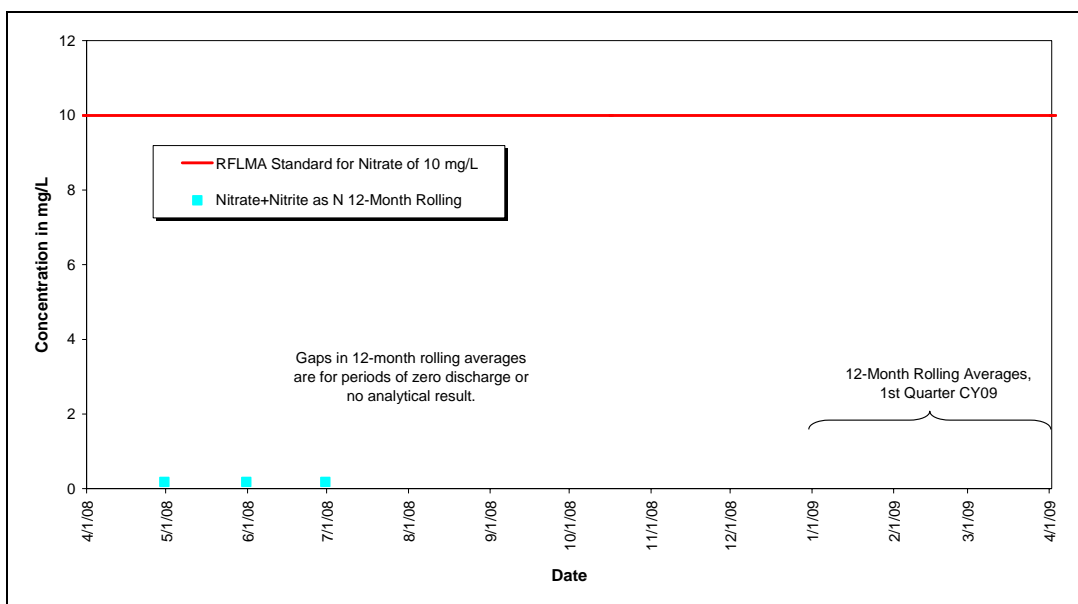


Figure 3–4. Volume-Weighted 12-Month Rolling Average Total U Activities at GS08: Calendar Year Ending First Quarter CY 2009



Note: Nitrate + nitrite as nitrogen 12-month averages are conservatively compared to the nitrate standard only.
mg/L = milligrams per liter

Figure 3-5. Volume-Weighted 12-Month Rolling Average Nitrate + Nitrite as Nitrogen Concentrations at GS08: Calendar Year Ending First Quarter CY 2009

3.1.2.4 Location GS11

Monitoring location GS11 is located on North Walnut Creek at the outlet of Pond A-4. Figure 3-6, Figure 3-7, and Figure 3-8 show no occurrences of reportable 12-month rolling averages for the quarter.

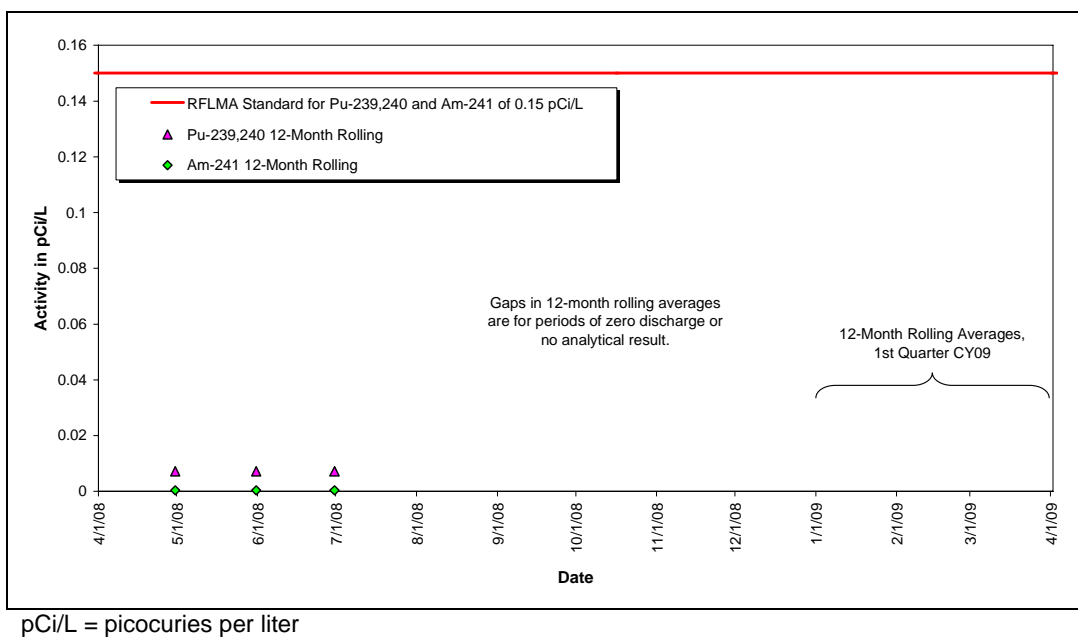


Figure 3-6. Volume-Weighted 12-Month Rolling Average Pu and Am Activities at GS11: Calendar Year Ending First Quarter CY 2009

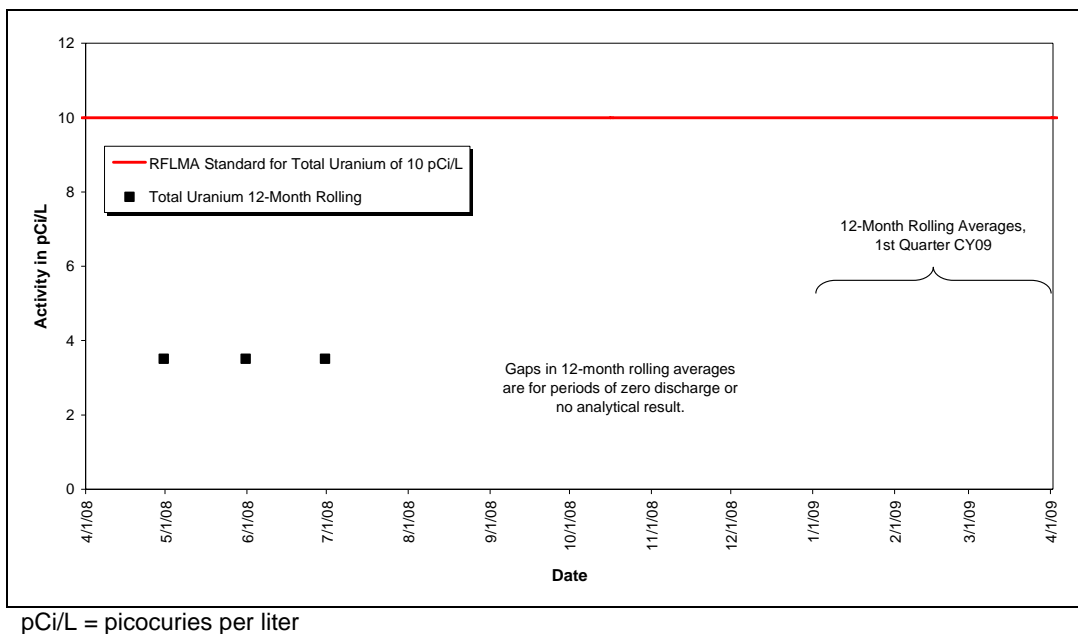


Figure 3–7. Volume-Weighted 12-Month Rolling Average Total U Activities at GS11: Calendar Year Ending First Quarter CY 2009

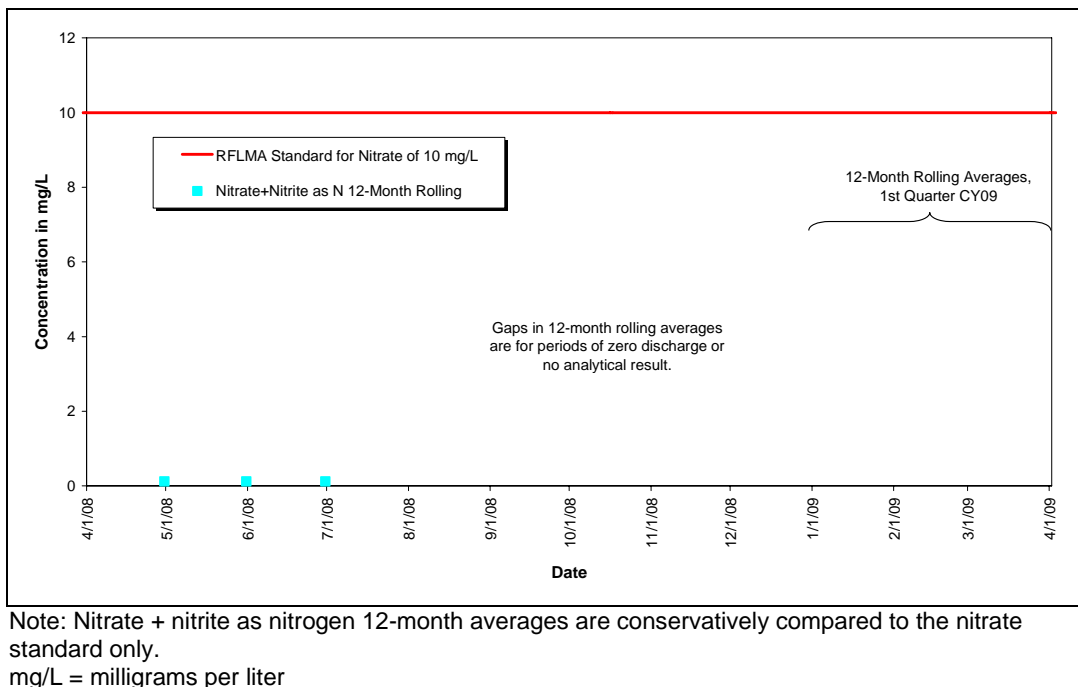


Figure 3–8. Volume-Weighted 12-Month Rolling Average Nitrate + Nitrite as Nitrogen Concentrations at GS11: Calendar Year Ending First Quarter CY 2009

3.1.2.5 Location GS31

Monitoring location GS31 is located on Woman Creek at the outlet of Pond C-2.

Pond C-2 was not discharged during first quarter CY 2009. The last discharge occurred during the July 1–July 14, 2005, time frame. Therefore, no compliance values can be calculated after June 30, 2006, and no plots are presented.

3.1.3 POE Monitoring

The following sections include summary tables and plots showing the applicable 30-day and 12-month rolling averages for the POE analytes.

3.1.3.1 Location GS10

Monitoring location GS10 is located on South Walnut Creek just upstream of the B-Series ponds. Figure 3–9 shows no reportable Pu or Am values during the quarter. In addition, none of the 85th percentile 30-day average metals concentrations were reportable for the quarter.

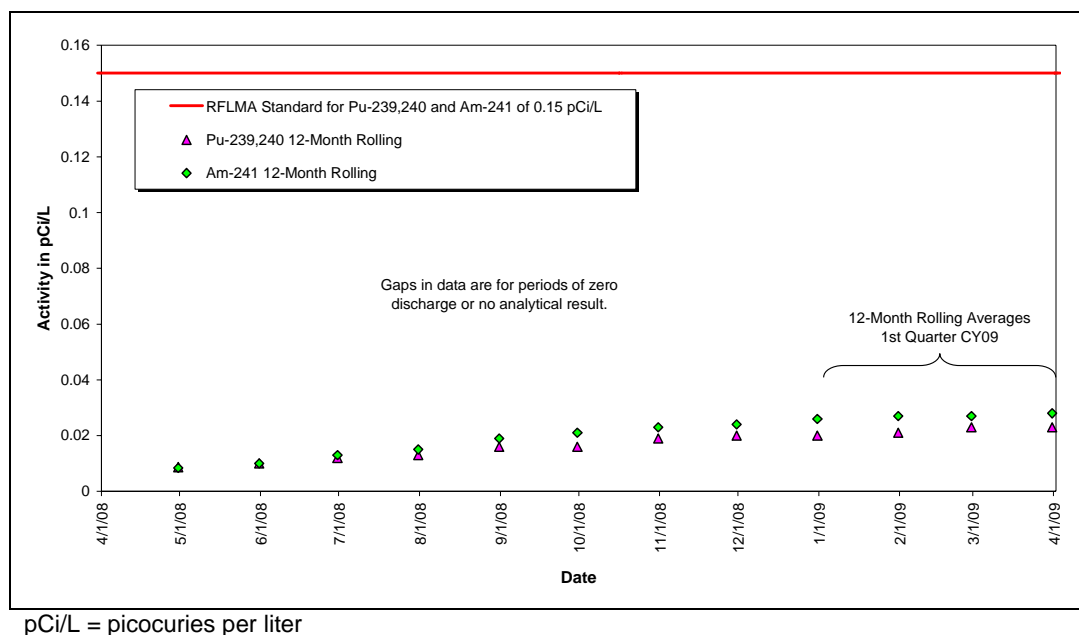


Figure 3–9. Volume-Weighted Average Pu and Am Compliance Values at GS10: Calendar Year Ending First Quarter CY 2009

Figure 3–10 shows reportable 12-month rolling averages for total U during the quarter. The Site continues to evaluate, in coordination with CDPHE, the measured U concentrations at GS10.

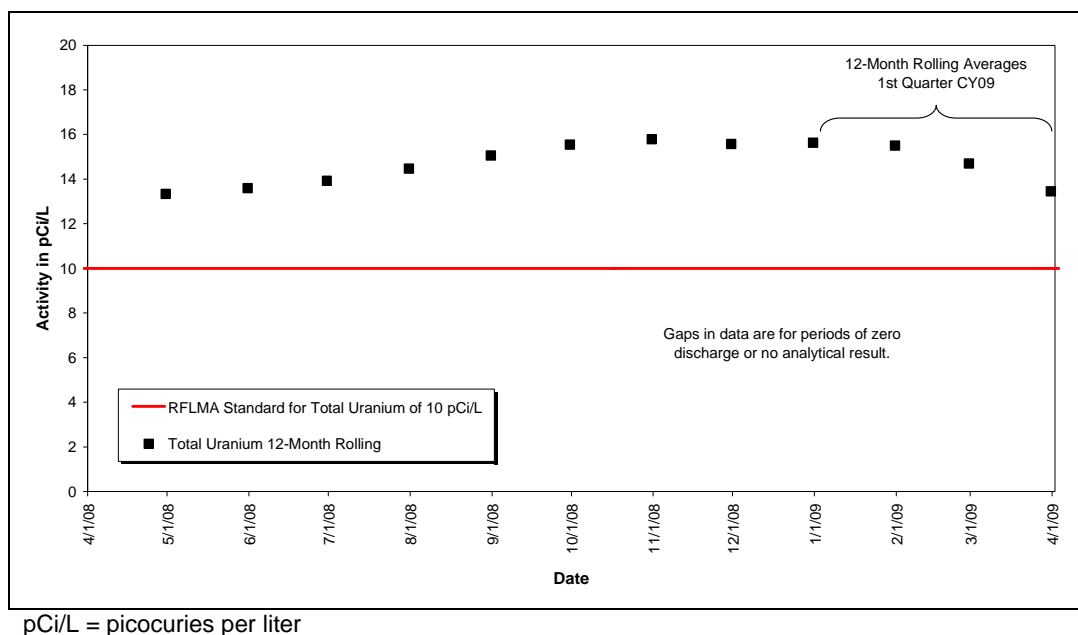


Figure 3-10. Volume-Weighted Average Total U Compliance Values at GS10: Calendar Year Ending First Quarter CY 2009

3.1.3.2 Location SW027

Monitoring location SW027 is located at the end of the South Interceptor Ditch at the inlet to Pond C-2. There was no flow at SW027 for the entire period from April 1, 2008, through April 1, 2009. Therefore, no compliance values are calculated and no plots are presented.

3.1.3.3 Location SW093

Monitoring location SW093 is located on North Walnut Creek 1,300 feet upstream of the A-Series ponds. Figure 3-11 and Figure 3-12 show no reportable Pu, Am, or total U values during the quarter. None of the 85th percentile 30-day average metals concentrations were reportable for the quarter.

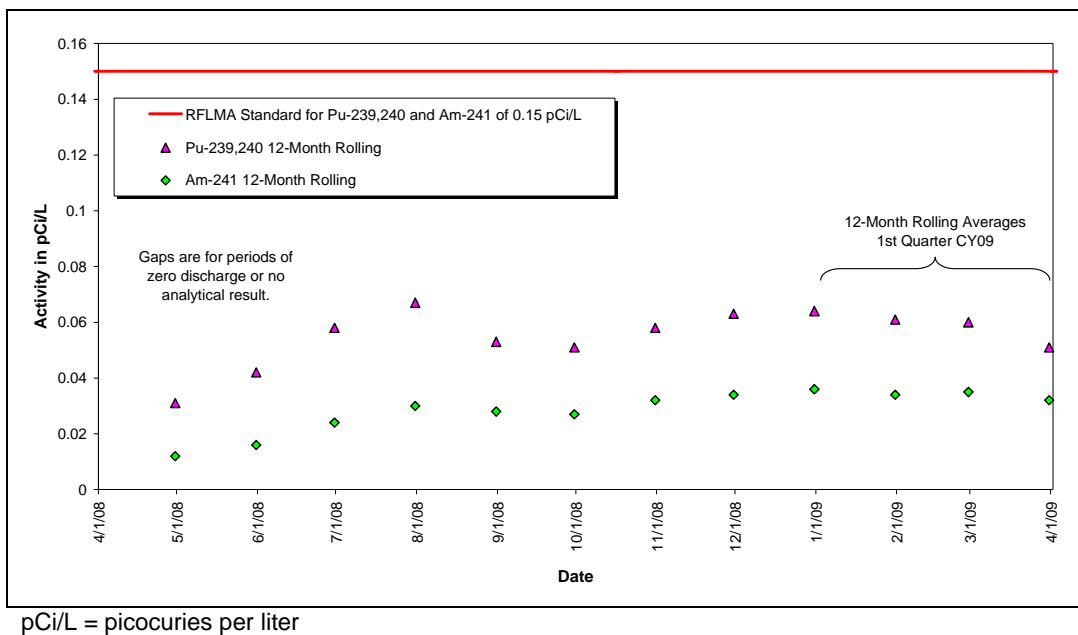


Figure 3–11. Volume-Weighted Average Pu and Am Compliance Values at SW093: Calendar Year Ending First Quarter CY 2009

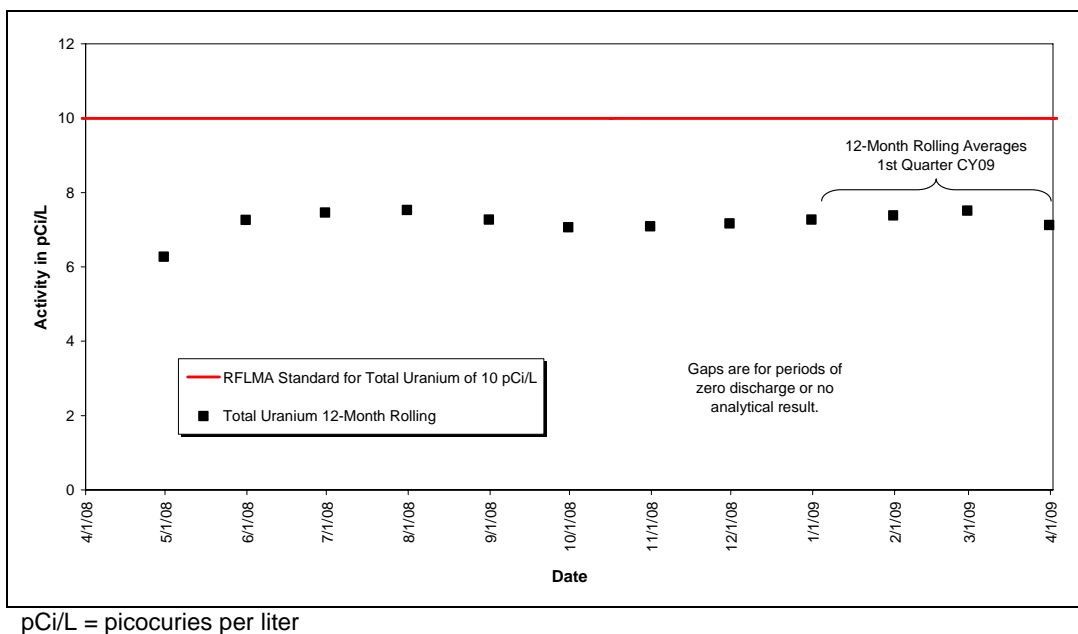


Figure 3–12. Volume-Weighted Average Total U Compliance Values at SW093: Calendar Year Ending First Quarter CY 2009

3.1.4 Area of Concern Wells and Surface Water Location SW018

Neither Area of Concern wells nor SW018 were scheduled for RFLMA monitoring in first quarter CY 2009.

3.1.5 Boundary Wells

No Boundary wells were scheduled for RFLMA monitoring in first quarter CY 2009.

3.1.6 Sentinel Wells

No Sentinel wells were scheduled for RFLMA monitoring in first quarter CY 2009.

3.1.7 Evaluation Wells

Two Evaluation wells (00191 and 50299) were scheduled for RFLMA monitoring in first quarter CY 2009 because they were erroneously omitted in second quarter CY 2008. Results were discussed in the 2008 annual report (DOE 2009).

3.1.8 PLF Monitoring

All RCRA groundwater monitoring wells at the PLF were sampled during first quarter CY 2009. Analytical results (Appendix C) will be discussed and statistically evaluated as part of the 2009 annual report. Surface water monitoring at the PLF is discussed in Section 3.1.10.4.

3.1.9 OLF Monitoring

All RCRA groundwater monitoring wells at the OLF were sampled during first quarter CY 2009. Analytical results (Appendix C) will be discussed and statistically evaluated as part of the 2009 annual report. Surface water downgradient of the OLF, as monitored at location GS59, shows no adverse impact from the OLF due to elevated concentrations of boron or U in groundwater.

During first quarter CY 2009, when routine surface water sampling was performed at Woman Creek downstream of the OLF (GS59), the analytical result for dissolved silver was greater than both the applicable surface water standard (Table 3–1) and the upstream concentration at location GS05.

Table 3–1. Woman Creek (GS59): Summary of Routine First Quarter CY 2009 Sampling Analytical Results Exceeding RFLMA Surface Water Standards

Composite Sample Period	Analyte	Result	Unit	RFLMA Standard	Basis for Standard ^a
1/2/09 11:44–3/2/09 9:52	Silver, dissolved	1.7	µg/L	1.0 (PQL)	TVS

Note: ^aTVS = table value standard (table value standards for metals are based on a toxicity equation, which uses a hardness value of 143 mg/L)
µg/L = micrograms per liter; PQL = practical quantitation limit

For silver at GS59, the routine result (during the first quarter) triggered increased monthly sampling frequency according to the RFLMA flowchart (see Table 3–2 for detail). Silver was undetected in the subsequent sample. All first quarter CY 2009 data continue to indicate that the remedy is functioning properly as related to surface water quality.

Table 3–2. Woman Creek (GS59): Summary of Monthly Analytical Results

Analyte	Composite Sample Period	Result	Unit
Silver, dissolved	1/2/09 11:44–3/2/09 9:52	1.7	µg/L
	3/2/09 9:52–4/6/09 11:23	nondetect	µg/L
	Status:	Discontinue monthly sampling for silver	

Note: The initial result triggering monthly sampling is shown in **bold**.

µg/L = micrograms per liter

3.1.10 Groundwater Treatment System Monitoring

As described in Section 2.2, contaminated groundwater is intercepted and treated in four areas of the Site. The MSPTS, ETPTS, and SPPTS include a groundwater intercept trench. Groundwater entering the trench is routed through a drain pipe into one or more treatment cells, where it is treated and then discharged to surface water. The PLFTS treats water from the northern and southern components of the GWIS and flow from the PLF seep.

3.1.10.1 Mound Site Plume Treatment System

No MSPTS monitoring locations were scheduled for RFLMA sampling in first quarter CY 2009.

3.1.10.2 East Trenches Plume Treatment System

No ETPTS monitoring locations were scheduled for RFLMA sampling in first quarter CY 2009.

3.1.10.3 Solar Ponds Plume Treatment System

No SPPTS monitoring locations were scheduled for RFLMA sampling in first quarter CY 2009. Non-RFLMA samples were collected at the SPIN, SPOUT, and SPPDISCHARGE GALLERY locations to support ongoing treatment system upgrades and evaluation efforts. These data will be discussed in the 2009 annual report.

3.1.10.4 PLF Treatment System

During collection of the January 20, 2009, sample at the system influent (location PLFSEEPINF), the flow rate was 1.05 gallons per minute. As of March 31, 2009, the Landfill Pond outlet remained in an open configuration.

During first quarter CY 2009, routine sampling of the treated effluent exiting the system (location PLFSYSEFF) showed that vinyl chloride, selenium, and dissolved silver concentrations were greater than the applicable surface water standards (Table 3–3). All other first quarter CY 2009 data were below applicable surface water standards.

Table 3–3. PLFTS Effluent (PLFSYSEFF): Summary of Routine First Quarter CY 2009 Grab-Sampling Analytical Results Exceeding RFLMA Surface Water Standards, January 20, 2008, Sample

Analyte	Result	Unit	RFLMA Standard	Basis for Standard ^a
Vinyl chloride	0.33	µg/L	0.2 (PQL)	W+F
Selenium	6.3	µg/L	4.6	AL
Silver, dissolved	1.9	µg/L	1.0 (PQL)	TVS

Note: ^a Basis abbreviations: W+F = Water plus Fish; AL = Aquatic Life; TVS = table value standard (table value standards for metals are based on a toxicity equation, which uses a hardness value of 143 mg/L). µg/L = micrograms per liter; PQL = practical quantitation limit.

For the Table 3–3 analytes at the PLFSYSEFF, the routine quarterly results triggered monthly sampling according to the RFLMA flowchart (see Table 3–4 for detail). All three analytes were undetected in the subsequent monthly samples. Given these results, monthly sampling of the PLFTS effluent for the Table 3–3 analytes was discontinued.

Table 3–4. PLFTS Effluent (PLFSYSEFF): Summary of Monthly Analytical Results

Analyte	Sample Date	Result	Unit
Vinyl chloride	1/20/09	0.33	µg/L
	2/27/09	nondetect	µg/L
	Status:	Discontinue monthly sampling for vinyl chloride	
Selenium	1/20/09	6.3	µg/L
	2/27/09	nondetect	µg/L
	Status:	Discontinue monthly sampling for selenium	
Silver, dissolved	1/20/09	1.9	µg/L
	2/27/09	nondetect	µg/L
	Status:	Discontinue monthly sampling for dissolved silver	

Note: The initial result triggering monthly sampling is shown in **bold**. The routine quarterly sample results are shown in *italics*. µg/L = micrograms per liter

3.1.11 Pre-Discharge Monitoring

Pre-discharge samples are collected prior to discharge at Ponds A-4, B-5, and C-2 on North Walnut Creek, South Walnut Creek, and Woman Creek, respectively.

No ponds were pre-discharge-sampled during first quarter CY 2009.

4.0 Adverse Biological Conditions

No evidence of adverse biological conditions (e.g., unexpected mortality or morbidity) was observed during monitoring and maintenance activities in first quarter CY 2009.

5.0 References

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